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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/812,416 | 03/30/2004 | Tetsuzo Ueda | 43890-673 | 1264 |

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| Washington, DC 20005-3096 | |

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| EXAMINER | |
| ARENA, ANDREW OWENS | |

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| ART UNIT | PAPER NUMBER |
| 2811 | |

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| MAIL DATE | DELIVERY MODE |
| 01/10/2008 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/812,416

Applicant(s)

UEDA ET AL.

Examiner

Andrew O. Arena

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 October 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2, 3, 5 and 51-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2, 3, 5 and 51-57 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination, for which this application is eligible, under 37 CFR 1.114, including timely payment of the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. The finality of the previous Office action has been withdrawn. Applicant's submission filed on 10/30/2007 has been entered.

Claim Rejections - 35 USC § 103

Claims 2, 3, 5 and 51-57 are rejected under 35 U.S.C. 103(a) as being obvious in view of Inoguchi (US 5,900,647) and Onojima (Appl. Phys. Lett., V.83, N.25, pg 5208).

RE claim 51, Inoguchi discloses an optoelectronic device (Fig 4, col 8 ln 28-33; Fig 6, col 11 ln 60-65) comprising,

a first III-V Nitride semiconductor epitaxial film (83) formed in contact with a substrate (21/22, 81/82) having 4H-type structure (col 10 ln 36-38), wherein said first III-V Nitride semiconductor epitaxial film is a AlN film (col 12 ln 29-30), and

a second III-V Nitride semiconductor epitaxial film (23-26, col 8 ln 53-58; 84-88, col 12) formed on said first III-V Nitride semiconductor epitaxial film, wherein said second III-V Nitride semiconductor epitaxial film contains Ga.

Inoguchi differs from the claimed invention only in not expressly disclosing the polytype of said III-V Nitride semiconductor epitaxial films.

Onojima teaches that high-performance devices may be realized with 4H-AlN on 4H-SiC substrates (e.g., pg 5210 col 2 ln 13-16) and further teaches such arrangements are desirable in the art due to certain appreciated advantages (pg 5208 col 1 ln 1-4).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that said III-V Nitride semiconductor epitaxial films are 4H films; at least for the advantages of such arrangement. Also MPEP § 2144.06-2144.07.

RE claim 2, Inoguchi discloses the substrate is silicon carbide (col 8 ln 38).

RE claim 3, the combined teachings relied upon disclose said III-V Nitride semiconductor epitaxial film is formed in contact with a substrate having (11-20) face (Onojima: pg 5210 col 2 ln 3).

RE claim 5, Inoguchi discloses a number of group III atoms are equal to a number of nitrogen atoms on a surface of said III-V Nitride semiconductor epitaxial film. Inoguchi discloses same composition; claimed property inherent. MPEP § 2112.01(II).

RE claim 52, Inoguchi discloses an optoelectronic device (Fig 4, col 8 ln 28-33) comprising,

a first III-V Nitride semiconductor epitaxial film (83) formed in contact with a substrate (21/22, 81/82) having 4H-type structure (col 10 ln 36-38);

a second III-V Nitride semiconductor epitaxial film (23-26, col 8 ln 53-58; 84-88, col 12) formed on said first III-V Nitride semiconductor epitaxial film; and

a waveguide (31; col 9 ln 44, col 8 ln 20) formed on said second III-V Nitride semiconductor epitaxial film,

wherein said first III-V Nitride semiconductor film is an AlN film (col 12 ln 29),

said second III-V Nitride semiconductor film contains Ga, and

said second III-V Nitride semiconductor epitaxial film includes an n-type layer (23, col 8 ln 59; 87/88, col 12 ln 51-58), a p-type layer (26, col 9 ln 10; 84/85, col 12 lns 33 & 66) and an active layer (25, col 9 ln 4-5; 86, col 12 ln 43-46), said active layer being formed between said n-type layer and said p-type layer.

Inoguchi differs from the claimed invention only in not expressly disclosing the polytype of said III-V Nitride semiconductor epitaxial films.

Onojima teaches that high-performance devices may be realized with 4H-AIN on 4H-SiC substrates (e.g., pg 5210 col 2 ln 13-16) and further teaches such arrangements are desirable in the art due to certain appreciated advantages (pg 5208 col 1 ln 1-4).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that said III-V Nitride semiconductor epitaxial films are 4H films; at least for the advantages of such arrangement. Also MPEP § 2144.06-2144.07.

RE claim 53, Inoguchi discloses a plurality of layers (23-26) are disposed between said waveguide (31) and said substrate (21).

RE claim 54, Inoguchi discloses said substrate having 4H [poly]type structure is SiC (col 10 ln 36-38).

RE claim 55, the combined teachings relied upon disclose said III-V Nitride semiconductor epitaxial film is formed in contact with a substrate having (11-20) face (Onojima: pg 5210 col 2 ln 3).

RE claim 56, the combined teachings relied upon disclose a number of group III atoms are equal to a number of nitrogen atoms on a surface of said III-V Nitride semiconductor epitaxial film. Onojima discloses same composition; claimed property inherent. MPEP § 2112.01(II).

RE claim 57, the combined teachings relied upon disclose said waveguide is formed as a straight line perpendicular to either (0001) face or (1-100) face (Inoguchi Fig 4 shows said stripe is perpendicular to the substrate face; the combination discloses the substrate face is (11-20), so the stripe must be perpendicular to either claimed face, since they are the two remaining axes, e.g. Onojima Fig 3 or applicant's Fig 2-4).

Response to Arguments

The arguments filed 10/30/2007 have been fully considered but they are not persuasive.

Inoguchi discloses several examples of laser devices (Fig 4, Fig 6), including embodiments having the claimed substrate (81/82) with a first AlN epitaxial layer (83) and a second Ga-containing III-V epitaxial layer (84-88).

The only feature of the claimed invention that is arguably missing from Inoguchi is an explicit teaching that said epitaxial layers are of the 4H-type, the advantages of which are taught by Onojima.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is 571-272-5976. The examiner can normally be reached on M-F 8:30-5.

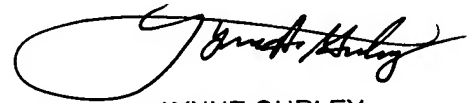
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne A. Gurley can be reached on 571- 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. For more info about PAIR, see <http://pair-direct.uspto.gov>. For questions PAIR access, contact the Electronic Business Center at 866-217-9197 (toll-free). For assistance from a USPTO Customer Service Rep or access to the automated info system, call 800-786-9199 or 571-272-1000.



Andrew O. Arena
7 January 2008



LYNNE GURLEY
SUPERVISORY PATENT EXAMINER

Av 2811, TC 2800